V

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,284	07/17/2003	Arkady Pittel	11627-002002	2394

26161 7590 03/20/2006

FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
SHAPIRO, LEONID	
ART UNIT	**PAPER NUMBER**
2677	

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,284	PITTEL ET AL.	
	Examiner	Art Unit	
	Leonid Shapiro	2677	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37,83-85,101 and 102* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20, 22, 24-32, 83-85,101 and 102* is/are rejected.

7)☒ Claim(s) *21,23 and 33-37* is/are objected to.

8)☒ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1-23, 101-102 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The newly introduced limitation of independent claims 1 and claim 102 have limitation: "calculating from the signals positions of the light at the two or more sensors, each at a resolution that is higher than the resolution of the pixels".

It is not clear, what the "resolution of the pixels" means? Is it sensor resolution or what?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-18, 22, 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa (US Patent No. 6,100,538) in view of Norita et al. (US Patent No. 6,243,165 B1).

As to claim 1, as best understood by examiner, Ogawa teaches a method (See Col. 1, Lines 7-22) comprising

conveying light from a moving light source on the writing instrument as an indication of a location (See Figs. 1, items 2, 24, Col. 8, Lines 14-18) and path of the writing instrument on a two-dimensional writing surface (See Fig. 1, items 1-2, Col. 4, Lines 18-33),

sensing the light at pixels of each of two or more sensors and generating a sequence of signals representative of the sensed light (See Fig. 1, items 3L-3R, Col. 6, Lines 43-56), and

applying a technique to increase a stability of the positions (See Fig. 1, items 3L-3R, from Col. 6, Line 65 to Col. 7, Line 3).

Ogawa does not disclose calculating from the signals positions of the light at the two or more sensors, each at a resolution that is higher than the resolution of the pixels.

Norita et al. teaches calculating from the signals positions of the light at the two or more sensors, each at a resolution that is higher than the resolution of the pixels (See Fig. 4-5, from Col. 7, Line 56 to Col. 8, Line 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Norita et al. teaching into Ogawa system in order to calculate the position of the light with higher resolution (See Col. 8, Lines 26-29 in the Norita et al. reference).

As to claims 2-3, 10, Ogawa teaches the technique is based on optics and the optics are configured to enhance the uniformity of signal response of the sensors. (See Figs. 1-2, items 3L-3R, from Col. 6, Line 65 to Col. 7, Line 3).

As to claims 4-5, 28-31, Ogawa teaches the lens comprises an aspheric and spherical lenses (See Fig. 2, item 9, from Col. 7, Line 62 to Col. 8, Line 1).

As to claims 6-7, 11, Ogawa teaches sensors comprise linear arrays of analog sensitive pixel elements (See Fig. 2, item 13, Col. 8, Lines 6-13).

As to claims 8-9, 32, Ogawa teaches the technique is based on algorithmic processing of the generated signals n which the algorithmic processing comprises mapping the signal response of the sensors based on parameters associated with the writing instrument (See Fig. 10, item S5 and Fig. 14, item S2).

As to claim 12, Ogawa teaches the technique is implemented in digital hardware (See Fig. 1, item 5, Col. 6, Lines 60-65).

As to claim 13, Ogawa teaches the technique is implemented in analog circuitry (See Fig. 19, item 21, Col. 14, Lines 37-44).

As to claim 14, Ogawa teaches the technique comprises an algorithmic technique that also reduces the effect of variations of the light intensity based on other than dimensional effects (See Fig. 8, item S5, Col. 10, Lines 32-35).

As to claim 15, Ogawa teaches the sensors comprise linear pixel-arrays (See Fig. 2, item 13, Col. 8, Lines 6-13), the signals are grouped in frames (in the reference is equivalent to CCD move and read) (See Fig. 10, item S4), and the signal processing

technique comprises processing of multiple frames to cancel noise (See Fig. 8, item S5, Col. 10, Lines 32-35).

As to claim 16-18, 22, Ogawa teaches the light conveyed from the moving writing instrument is modulated at a frequency related to the rate at which the signals are generated by the sensors (See Fig. 19, items 24r,24g,24b, Col. 15, Lines 12-52).

As to claim 27, as best understood by examiner, Ogawa teaches apparatus (See Col. 1, Lines 7-22) comprising

a sensor to receive light (See Fig. 1, items 3L-3R, Col. 6, Lines 43-56) from a writing instrument (See Figs. 1, items 2, 24, Col. 8, Lines 14-18) moving across an X-Y writing surface (See Fig. 1, items 1-2, Col. 4, Lines 18-33),

in which optics have an instability and are configured to enhance optical power of the light received from the writing instrument (See Figs. 1-2, items 3L-3R, from Col. 6, Line 65 to Col. 7, Line 3).

Ogawa does not disclose optics that enable calculation of a position of the light at a resolution that is higher than the resolution of the pixels.

Norita et al. teaches optics that enable calculation of a position of the light at a resolution that is higher than the resolution of the pixels (See Fig. 4-5, from Col. 7, Line 56 to Col. 8, Line 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Norita et al. teaching into Ogawa system in order to calculate the position of the light with higher resolution (See Col. 8, Lines 26-29 in the Norita et al. reference).

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa and Norita et al. as applied to claim 1 above, and further in view of Leduc et al. (Fr. Patent No. 84 08852).

Ogawa and Norita et al. do not disclose the frame rate is varied.

Leduc et al. teaches the frame rate is varied (See Figs. 1,3, Title).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Leduc et al. teaching into Ogawa and Norita et al. system to increase noise immunity.

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa and Norita et al. as applied to claim 18 above, and further in view of Hong (US Patent No. 5,227,732).

Ogawa and Norita et al. do not disclose the chopped signals are integrated over time.

Hong teaches the chopped signals are integrated over time (See Fig. 3, item 12, from Col. 2, Line 66 to Col. 3, Line 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Hong teaching into Ogawa and Norita et al. system to reduce noise include in the luminance signal (See Col. 1, Lines 5-11 in the Hong reference).

5. Claims 83-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of Stork et al. (US Patent No. 6,181,329 B1).

As to claim 83, Ogawa teaches a method comprising locating a writing instrument at a succession of locations on a writing surface (See Fig. 1, items 1-2, Col. 4, Lines 18-33),

generating signals representative at sensors from light received from writing instruments at the succession of location (See Fig. 1, items 3L-3R, Col. 6, Lines 43-56).

Ogawa does not disclose determining calibration parameters for the writing instrument for use in calibrating a process that determines the locations of the writing instrument as it is being moved on the writing surface.

Stork et al. teaches determining calibration parameters for the writing instrument for use in calibrating a process that determines the locations of the writing instrument as it is being moved on the writing surface (See from Col. 5, Line 54 to Col. 6, Line 9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Stork et al. teaching into Ogawa system in order to use the writing instrument in many different environments (See Col. 1, Lines 31-36 in the Stork et al. reference).

As to claim 84, Stork et al. teaches the calibration parameters comprise coefficients used in polynomial series that are part of the position determining process (See Col. 5, Lines 54-66).

6. Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa and Stork et al. as applied to claim 83 above, and further in view of Kitai et al. (US Patent No. 6,501,061 B1).

Ogawa and Stork et al. do not disclose positions do not lie on a regular rectangular grid.

Kitai et al. teaches positions do not lie on a regular rectangular grid (See Fig. 4A, item 100, Col. 6, Lines 9-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Kitai et al. teaching into Ogawa and Stork et al. system to improve calibration methods (See Col. 1, Lines 43-44 in the Kitai et al. reference).

7. Claim 101 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of Norita et al. and Behrends (US Patent No. 5,572,607).

As best understood by examiner, Ogawa teaches a method comprising receiving light from a moving writing instrument (See Fig. 1, item 2) at a light sensor having an array of sensitive pixel elements (See Fig. 1, items 3L-3R, Col. 6, Lines 43-56 and Col. 7, Lines 44-48).

Ogawa does not disclose determining a location in the array with a resolution that is higher than the resolution of the pixel elements.

Norita et al. teaches determining a location in the array with a resolution that is higher than the resolution of the pixel elements (See Fig. 4-5, from Col. 7, Line 56 to Col. 8, Line 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Norita et al. teaching into Ogawa system in order to calculate the position of the light with higher resolution (See Col. 8, Lines 26-29 in the Norita et al. reference).

Ogawa and Norita et al. do not disclose determining a location in the array at which the maximum intensity of light has been received from the writing instrument.

Behrends teaches determining the location in the array at which the maximum intensity of light has been received from the writing instrument (See Fig. 7, item Ik, Col. 7, Lines 44-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Behrends teaching into Ogawa and Norita et al. system to improve correction of intensity (See Col. 2, Lines 38-44 in the Behrends reference).

8. Claim 102 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa, Norita et al. and Behrends in view of Ito et al. (US Patent No. 4,650,335).

Ogawa teaches determining an integer pixel location that is closest to location (See Fig. 1, items 3L-3R, Col. 6, Lines 43-56 and Col. 7, Lines 44-48).

Ogawa, Norita et al. and Behrends not disclose finding a fractional center of gravity of subarray that is centered on the integer pixel location.

Ito et al. teaches finding a fractional center of gravity of subarray that is centered on the integer pixel location (See Col. 4, Lines 44-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Ito et al. teaching into Ogawa, Norita et al. and Behrends system to improve correction of intensity (See Col. 2, Lines 38-44 in the Behrends reference).

9. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of Wood et al. (US Patent No. 6,414,673 B1).

As to claim 24, Ogawa teaches a method (See Col. 1, Lines 7-22) comprising

conveying light from a moving light source on the writing instrument in a time-changing pattern of directions (See Figs. 1, items 2, 24, Col. 8, Lines 14-18),

sensing the light at pixels of each of two or more sensors spaced from a writing instrument (See Fig. 1, items 3L-3R, Col. 6, Lines 43-56).

Ogawa does not disclose determining the location of the writing instrument by detecting a phase difference between signals measured at the two or more sensors.

Wood et al. teaches determining the location of the writing instrument by detecting a phase difference between signals measured at the two or more sensors (See Fig. 14, items 16, 18, 20a-20b, Col. 8, Line 33-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Wood et al. teaching into Ogawa system in order to calculate the position of the pen (See Col. 3, Lines 6-25 in the Wood et al. reference).

As to claim 25, Wood et al teaches a rotating pattern with respect to an X-Y plane (See Col. 16, Lines 21-32).

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa and Wood et al. as applied to claim 25 above, and further in view of Zuta (US patent No. 5,239,139).

Ogawa and Wood et al. do not disclose phase quadrature of two signal.

Zuta teaches phase quadrature of two signal (See Col. 8, Lines 56-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Zuta teaching into Wood et al. and Ogawa system in order to calculate the position of the pointing device (See Col. 1, Lines 37-42 in the Zuta reference).

Allowable Subject Matter

11. Claims 21, 23, 33-37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Relative to claim 21 the major difference between the teaching of the prior art of record (Ogawa, Norita et al) and the instant invention is that the light conveyed from the light source includes a strong short pulse imposed on the modulation frequency, and a phase lock loop determines the modulation frequency from the sensor signals, and the sensor signal is sampled at the times triggered by the phase lock loop during the

duration of the strong short pulse.

Relative to claim 23 the major difference between the teaching of the prior art of record (Ogawa, Norita et al) and the instant invention is that the conveyed light includes periods of lower frequency modulation and bursts of higher frequency modulation, and the sensor signal associated with the higher frequency bursts is used to lock onto a modulation clock.

Relative to claim 33 the major difference between the teaching of the prior art of record (Ogawa, Norita et al) and the instant invention is that the processes determine the integral power of the overall signal distribution on the sensor and calculate a position of the light at a resolution that is higher than the resolution of the pixels based on half of the integral power position.

Relative to claim 34 the major difference between the teaching of the prior art of record (Ogawa, Norita et al) and the instant invention is that the processes use a polynomial approximation on the signal distribution and calculate a position of the light at a resolution that is higher than the resolution of the pixels as a position of approximated maximum.

Claims 35-37 depend on claim 34.

Response to Arguments

12. Applicant's arguments with respect to claims 1-37, 101-102 have been considered but are moot in view of the new ground(s) of rejection.

13. Applicant's arguments with respect to claims 1, 83 have been fully considered but they are not persuasive:

On page 10, last paragraph of Remarks, Applicant's stated that in Ogawa " circuit component ... generates left angular information based on the one-dimensional linear image supplied from the linear image sensor". However, Figure 1 clearly disclose two detecting units: left-hand detecting unit 3L and right detecting unit 3R to compute the positional coordinates of the pointer (See Col. 6, Lines 43-56).

On same page, the same paragraph of Remarks, Applicant's stated there is no indication of what resolution the sensor is capable. However, claim 1 does not have the resolution as limitation.

On page 11, last paragraph and 1st paragraph on page 12 of Remarks, Applicant's stated that amended claim 83 to calibrate a process that determines "the locations of the writing instrument as being moved on the writing surface". However, Stork et al. also calibrating the writing instrument as being moved on the writing surface by putting the sensors in known positions (See Fig. 1, item 190, Col. 5, Lines 57-63).

On page 12, 2nd paragraph of Remarks, Applicant's stated that there is no motivation to combine the references and environmental factors not relevant to using light sensors. However, environmental factors like temperature always relevant to determine location on the writing surface to determine the position of the writing instrument (See Fig. 1, item 190, Col. 1, Lines 31-36) and Col. 5, Lines 57-63).

Applicant's arguments, with respect to the rejection(s) of claim(s) 24 using Ogawa reference have been fully considered and are persuasive. Therefore, the rejection has

been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wood et al.

Telephone Inquire

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 571-272-7683. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LS
03.04.06

BIPIN SHALWALA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600